CHARACTERIZATION OF CELLULASES BY *Aspergillus fumigatus* USING OIL PALM FROND THROUGH SOLID STATE FERMENTATION

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ABSTRACT

CHARACTERIZATION OF CELLULASES BY *Aspergillus fumigatus* USING OIL PALM FROND THROUGH SOLID STATE FERMENTATION

There are lacks of microorganisms that can produce sufficient amount of three types of cellulases to break down the crystalline cellulose into glucose from the cellulosic wastes generated by agricultural and industrial activities. This study aims to characterize the thermostable enzyme produced by *Aspergillus fumigatus* (previously isolated) in solid state fermentation using oil palm frond. The thermostable cellulase enzyme activities characterized by CMCase and FPase activities were concurrently done after 3 days of fermentation. This fungi colony has grayish color and smooth walled surface through macroscopic observation whilst the structures of fungi such as vesicle, conidiophore, conidia and phialide were done by microscopic observation. CMCase assay showed higher enzyme production compared to FPase assay. The highest enzyme production for CMCase and FPase assays are 0.0535 U/mL and 0.0249 U/mL respectively. The enzyme production is low due to high temperature during fermentation and small amount of substrate has been used. The highest reducing sugar obtained is 0.865 µmole on day 9 for reducing sugar analysis. Reducing sugar analysis showed that enzymatic hydrolysis did occurred where the cellulases broke down the cellulose into sugars. This study has proved that *Aspergillus fumigatus* can be used to degrade cellulosic wastes into soluble sugar by-products. It is suggested to prolong the enzyme production period to observe the production trends of the enzymes and increase the amount of substrate to reduce the water content to obtain higher amount of sugar produce.